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PATENTS

New Attorney Docket No. 38572-0024
Old Attorney Docket No. 031788-0010

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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11/15/02

In re Application of: : Group Art Unit: 1714
Paul J. GLATKOWSKI et al. :
App. No.: 09/894,879 : Examiner: K. Wyrozebski
Filed: June 29, 2001 :
Title: ELECTROMAGNETIC SHIELDING COMPOSITE COMPRISING NANOTUBES

Commissioner for Patents
United States Patent and Trademark Office
Washington, DC 20231

Sir:

Declaration under 37 C.F.R. §1.131

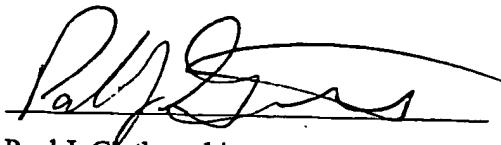
I, Paul J. Glatkowski, am an inventor of the invention disclosed and claimed in the above-referenced patent application.

I conceived and reduced to practice a composite having nanotubes with an aspect ratio which provides the composite with electromagnetic shielding prior to November 4, 1998, and therefore prior to the filing date of U.S. Patent No. 6,280,677 to Yakobson (Yakobson), as evidenced by the documents attached hereto.

Under my direction, tests were preformed on composites containing nanotubes to assess electromagnetic shielding. Briefly, 1.5 weight percent commercially available nanotubes were incorporated into composites and exposed to radiation at various frequencies and degrees of orientation. The results of are shown in the attached Test Report.

Data in the Test Report was normalized for a thickness of 1 mm and described in Table 2, which shows a shielding effectiveness of 182 dB at a loading level of only 1.5 wt%. Thus, the data shown in Table 2 reveals that the composites clearly offer both electromagnetic shielding and low observability.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above identified application or any patent issued thereon.



Date: 10/28 2002

Paul J. Glatkowski

Attached: Test Report and Table 2.

TEST REPORT**SHIELDING EFFECTIVENESS TEST**

NO.	SAMPLE	Effective Thickness, millimeters	SHIELDING EFFECTIVENESS, dB, at Frequency								
			20 kHz SE _{pu}	0.4 MHz SE _{pu}	15 kHz SE _{pu}	0.2 GHz SE _{pu}	1.5 GHz SE _{pu}	20 kHz SE _m	0.4 MHz SE _m	15 kHz SE _m	0.2 GHz SE _m
1	9/1 SH	0.56	102	65	101	64	102	65	103	-	103
2	NEAT N	1.95	61	33	62	35	63	34	65	-	67
3	9/1 H	0.64	73	31	72	33	74	36	76	-	77
4	15% Carbon	3.12	106	85	105	86	106	87	108	-	108
5	9/1 N	2.23	102	63	102	64	103	65	104	-	105

COMMENTS

1. The test per ASTM D4735, MIL-STD-290-1991, MIL-STD-1037, MIL-SMH-1000-125A, MIL-STD-461C and MIL-STD-462.
2. Test conditions: T=22°C, RH=39%, P=101.7 kPa.
3. Each magnitude of the plane wave (SE_{pu}) and magnetic (SE_m) shielding effectiveness in the table above is an average from six (six) runs of the test at a given frequency. The experimental error evaluated by the partial derivatives and least squares method does not exceed 6%.
4. The linear arrangement of the generator and receiver antennas and the samples under test meet the requirements of MIL-STD-188-125A and the EM Performance Test Plan CTDSS-3RPT-39301 02-10-94.

5. INSTRUMENTS AND DEVICES USED

- Generators: Model ESDA HP (0.5 MHz to 110 MHz) and Model 8673 HP (50 MHz to 10 GHz)
- Analyzers: Model 8592B HP and 8593E HP (both 9 GHz to 22 GHz)
- Oscilloscope 1D-4540 MS, Nanoammeter 3503 RU with Metrolab Laser PL059S/C NII
- Antennas: HP1196BC, HP1196CE, HP1196EF; Dipole Antenna Set HP1196EH
- Magnetic Field Pickup Coil HP11966K, Active Loop H-field HP11965A
- Dual Preamplifier HP8447F
- Goniometer 3501-05 F-OM, Micrometer Netwerkje (10000 no), Starrett Dial Indicator 25-103 (1270 no)

6. The equipment listed above meets the applicable NIST, ASTM, OSHA and State requirements and was calibrated with the standards traceable to the NIST. The calibration was performed per ISO 9001 §4.11, ISO 9002 §4.10, ISO 9003 §4.6, ISO 9004 §13, MIL-STD-45662, MIL-I-45208, IEEE-STD-498, NAVAIR-17-35/MIL-1, and CSP-1/03-93.
7. The equipment used in the test passed a periodic accuracy test in June 1997. The linear and angular measuring instruments were calibrated in December 1997. Next test - June 1998.

Table 2

Sample Loading and Shear	Thickness	Shielding Effectiveness Test, dB, at Frequency									
		20 kHz		0.4 MHz		15 MHz		0.2 GHz		1.5 GHz	
		SE _{pw}	SE _m	SE _{pw}	SE _m	SE _{pw}	SE _m	SE _{pw}	SE _m	SE _{pw}	SE _m
Requirement		100		100		100		100		100	
1.5 wt% NT H	1 mm	182	116	180	114	182	116	184	-	184	-
1.5 wt% NT M	1 mm	114	48	113	52	116	56	119	-	120	-
1.5 wt% NT N	1 mm	46	28	46	29	46	29	47	-	47	-
Neat PET	1 mm	31	17	32	18	32	17	33	-	34	-

SE_{pw} = plane wave; SE_m = magnetic; H = high shear; M = medium shear; N = no to low Shear